

Remarks

Favorable reconsideration of this application is requested in view of the following remarks and discussion.

Claims 1, 4-6, 9-12, 17-22, 26, 27, 30-32, 36-42, 44, 56, 58-60, 62, 63, 67, 75, and 76 are currently pending in the application.

In the outstanding Office Action independent Claims 1, 18, and 19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,155,652 to Logan et al. (Logan) in view of U.S. Patent No. 5,846,375 to Gilchrist et al. (Gilchrist) and Japanese Publication No. 7-335630 to Manabu. Independent Claim 56 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Logan, Gilchrist, and Manabu in view of Japanese Publication No. 07-272837 to Arai et al. (Arai). The remaining, dependent claims are also rejected, in combination with these references. It is requested that the rejections of the claims be withdrawn for the following reasons.

The present invention is directed to ceramic heater systems (e.g., as recited in independent Claims 1, 18, and 56), as well as processing apparatuses including the ceramic heater systems (e.g., as recited in independent Claim 19). Independent Claims 1, 18, 19, and 56 recite a gas passage provided in a heater base. The gas passage includes a plurality of first passages disposed concentrically in the heater base and a plurality of second passages connecting the plurality of first passages without being aligned in a direction towards a center of concentricity of the plurality of first passages.

It is submitted that the Office Action does not rely on any of Logan, Gilchrist, or Aria to disclose or render obvious the claimed features of a plurality of first passages disposed concentrically in a heater base and a plurality of second passages connecting the plurality of first passages without being aligned in a direction towards a center of concentricity of the

plurality of first passages. Instead, the Office Action relies on Manabu to disclose these features, and in particular points to Figure 7 of Manabu.¹

Contrary to the Office Action's assertions, however, Manabu does not disclose the claimed first and second passages. To the extent that the channels between adjacent grooves 7 are asserted to be analogous to the claimed features of the second passages, it is submitted that these channels are, in fact, aligned with one another in a radial direction (i.e., a direction towards a center about which the grooves 7 appear to be concentric). This is in direct opposition to the claimed features recited in independent Claims 1, 18, 19, and 56, which recite a plurality of second passages connecting a plurality of first passages without being aligned in a direction towards a center of concentricity of the plurality of first passages.

The features recited in the claims provide numerous features that are not provided by the references of record in the application. The claimed first and second passages ensure both effective heat exchange and high cooling efficiency. Specifically, the claimed invention can provide first and second passages having large cross sectional areas permitting rapid cooling, while avoiding the disadvantage of poor heat transfer common to conventional heater systems, which is caused by cooling passages having large cross sectional areas. The use of the claimed first and second passages permits the flow of a heated fluid during a heating operation. The connections between the first and second passages result in a uniform flow of the heated fluid, such that a temperature of the mounting surface of the heater system can be uniformly maintained and controlled. Further, the use of the claimed first and second passages permits a uniform flow of a cooled fluid during a cooling operation. The uniform flow through the large cross sectional area first and second passages quickly and efficiently cools the mounting surface, while permitting the cooling of the surface to be uniformly maintained and controlled. In contrast, this uniform control cannot be achieved solely with a

¹ Page 6, lines 12 and 13, of the Office Action.

plurality of concentric passages, or a plurality of concentric passages connected by channels that are aligned with one another.

For the foregoing reasons, it is requested that the rejections of independent Claims 1, 18, 19, and 56 under 35 U.S.C. § 103(a) be withdrawn, and the allowance of independent Claims 1, 18, 19, and 56 is requested.

Claims 4-6, 9-12, 17, 20-22, 26, 27, 30-32, 36-42, 44, 58-60, 62, 63, 67, 75, and 76 are allowable for the same reasons as the independent claims from which they depend, as well as for their own features. Thus, the allowance of dependent Claims 4-6, 9-12, 17, 20-22, 26, 27, 30-32, 36-42, 44, 58-60, 62, 63, 67, 75, and 76 is requested.

Notwithstanding the above discussion, with is asserted to provide sufficient grounds for the allowance of the pending claims, the claims recite further features that are not disclosed or rendered obvious by the applied reference.

The claimed heater systems are capable of heating a substrate to a high temperature (e.g., from about 500 °C to about 700 °C), and then rapidly cooling a heater body (e.g., to a temperature from about 100 °C to about 500 °C). Because the heater system can be rapidly heated and cooled, subsequent processes can be carried out over a shorter time interval as compared to a heater system in which a long time interval is required between heating and cooling operations.

It is submitted that the heating layer 130 of the electrostatic chuck of Logan is not disclosed as able to quickly heat a substrate. Thus, Logan does not disclose or render obvious the claimed heater system capable of rapidly heating a substrate to a high temperature and rapidly cooling a heater body to a low temperature.

Gilchrist is also directed to an electrostatic chuck. However, the chuck of Gilchrist is also not well suited to rapid heating of a substrate and rapid cooling of a heater body. Gilchrist does not disclose a ceramic body or a heater disposed in the body, as recited in the

claims. Rather, Gilchrist discloses that both heating and cooling are performed by flowing heating and cooling agents through a conduit 32 of a body 15.

Manabu is directed to a stage 3 including the grooves 7 to cool a wafer that has been heated by plasma. Manabu does not disclose a ceramic body or a heater disposed in the body. In fact, Manabu does not even disclose that the wafer is heated by the stage 3.

For these reasons, it is submitted that none of Logan, Gilchrist, or Manabu discloses or renders obvious the claimed heater systems, which can be rapidly heated and cooled, subsequent processes can be carried out over a shorter time interval as compared to a heater system in which a long time interval is required between heating and cooling operations.

The foregoing provides sufficient alternate grounds for the allowance of the claims.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1, 4-6, 9-12, 17-22, 26, 27, 30-32, 36-42, 44, 56, 58-60, 62, 63, 67, 75, and 76 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact the undersigned representative at the below listed telephone number.

Customer Number

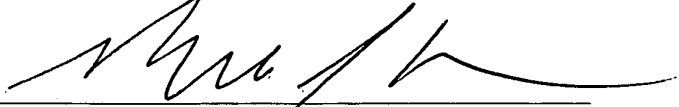
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